Application of Beneficial Soil Bacteria in Crop Production Management Under Saline and Drought Stress via Decreasing Ethylene

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Received: January 2015, and Accepted: August 2015

Abstract

A wide range of Iranian agricultural lands are located in arid and semi-arid regions and they are facing to saline and drought stresses condition. So, finding an approach to increase tolerance of plant under this condition is highly valuable. Ethylene is an important hormone for normal growth and development of plants. However, high concentration of this hormone due to the environmental stresses such as drought and salinity prevent plant growth. Some of the plant growth rhizobacteria contain ACC deaminase enzyme that is capable to convert 1-aminocyclopropane-1-carboxylate, the precursor of ethylene in plants to α-ketobutyrate and ammonia and decrease ethylene level under stress condition. Plant growth promoting rhizobacteria or PGPR can stimulate the plants growth by different mechanisms. The previous investigations revealed that using natural or recombinant bacteria that containing ACC deaminase genes are capable to eliminate the stress ethylene in drought and salinity conditions. The most important practical research program that can be offered are screening of ACC deaminase producing bacteria native to dry and saline soils of Iran, transformation of other indigenous PGPRs and production of transgenic plants with ACC deaminase genes. Growing trend in higher education and existing of reach sources of bacteria in the rhizosphere of plants are hopefully approach for overcoming to drought and salinity stress.

Key words: ACC deaminase, Biofertilizer, Enzyme.

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